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EXPLOSION HAZARD FROM ETHYL ETHER IN DISASTER HOSPITAL KITS

(Ethyl Ether synonyms: diethyl ether, ether, ethyl oxide) (CAS# 60-29-7)

ALERT

PROBLEM

Ethyl ether was distributed to states in the 1960s and 1970s as part of civil defense hospital kits. It was originally intended for use as an anesthetic. The ethyl ether remaining in the hospital kits should later have been disposed. Much of it wasn't. The ethyl ether now presents an explosive and toxic hazard.

Ethyl ether auto-oxidizes to form explosive polymeric peroxides. It also tends to absorb and react with oxygen from the air to form unstable peroxides that may detonate with extreme violence when disturbed by heat, shock, or friction. An 8-ounce can or vial of ethyl ether in which peroxides have formed has the potential explosive force of one stick of dynamite.

In the 1980s, the federal government issued orders to dispose of the hospital disaster kits. However, in some cases, local authorities did not dispose of the kits, but had the kits stored in various locations, including public buildings. EPA Region 1 recently discovered that of eight hospital kits recorded as having been disposed, six kits were still in storage.

Authorities have speculated that ethyl ether from the hospital kits may have caused several fires of unknown origin in municipal buildings across the country. Although no explosions associated with ethyl ether have been reported, be on the lookout for old hospital disaster kits containing ethyl ether in your area.

HAZARD AWARENESS

Pure Ethyl Ether

In addition to being extremely flammable and potentially explosive, ethyl ether is also toxic.

Ethyl ether's boiling point, 94.3° F, is an indication of its volatility. Its low flash point, -42° F, signals that it can be ignited easily when mixed with air. Indeed, such mixtures can explode when ignited if the concentration by volume of ethyl ether in air is between 1.9 percent and 36.5 percent. Hence, sources of ignition like heat, flames, and sparks must be eliminated where ethyl ether is stored.

Ethyl ether can affect the body if it is inhaled, swallowed, or comes in contact with the eyes or skin. Ethyl ether is listed by the Occupational Safety and Health Administration (29 CFR 1910.1000) as having a permissible exposure level for a 40-hour work-week of 400 parts per million in air. Short term overexposure to ethyl ether may cause irritation of the eyes, nose, and throat. It is also a depressant of the central nervous system and may cause dizziness, stupor, nausea, drowsiness, unconsciousness, or even death.

Old Ethyl Ether

The greatest danger from the caches of ethyl ether recently rediscovered is that of explosion when attempts are made to move them. The longer the ethyl ether

has been stored, the greater the explosion hazard as peroxides build up. Peroxides that are formed in the ethyl ether may detonate if they are jarred or stressed, for example when opening the container lid.

Since peroxides form in ethyl ether exposed to air, ***a partly filled container or one that has been opened is more dangerous than a filled, unopened one.*** Hence, prompt removal and destruction of aged ethyl ether by trained personnel is essential.

IDENTIFYING ETHYL ETHER

The old ethyl ether uncovered recently is typically contained in 8-ounce screw top cans that also have a removable red elastomeric stopper in a spout. Both the cans and cases are typically labeled.

SEARCHING FOR ETHYL ETHER

When the presence of ethyl ether is suspected, a qualified team should conduct the search: fire fighters, police, bomb squad, and emergency medical services, as well as local and state emergency management personnel. In the interim between discovery and removal, access to the ethyl ether should be restricted, so that unauthorized personnel, including untrained workers, children, pets, and curious visitors do not inadvertently cause the ethyl ether to explode or expose themselves to the fumes. ***Since ethyl ether stored a long time may be shock sensitive,*** the team must take extensive precautions to prevent harm to people when removing and disposing of the ethyl ether.

DISPOSAL OF ETHYL ETHER

You should treat old ethyl ether as an explosive, even if you do not believe it was exposed to air. Only personnel specifically trained for the job should dispose of old ethyl ether. Possible methods of disposal include detonation from a distance, controlled incineration, or dilution with certain solvents. Such treatment of ethyl ether must be in compliance with the Resource Conservation and Recovery Act. Ethyl ether may not be put into either a household waste landfill or a hazardous waste landfill.

For information on how to dispose of ethyl ether safely, you should contact your state pollution control or environmental management agency. The state agency will be able to give you advice on what methods of disposal are allowed under state law and what permits are necessary to dispose of ethyl ether. The state agency may also be able to direct you to companies qualified to handle this type of job.

INFORMATION RESOURCES

The ethyl ether distributed decades ago as components of disaster hospital kits and still being stored is the responsibility of the local and state governments that accepted it. EPA can assist those responsible for disposing of it with advice and information.

Also, State Emergency Response Commissions and Local Emergency Planning Committees may be helpful in dealing with old ethyl ether.

To learn more about the hazards of ethyl ether and correct methods of handling and disposing of it, contact the hotline listed below.

Emergency Planning and Community Right-to-Know Information Hotline

(800) 535-0202

Monday through Friday
8:00 am to 7:30 pm
(eastern time)

Chemical Emergency Preparedness and Prevention Office

US Environmental Protection Agency
(5101)
401 M Street, SW
Washington, DC 20460